Trend of Soil Erosion Processes within the Southern Half of the Russian Plain for the Last Decades

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Abstract

© Published under licence by IOP Publishing Ltd. Complex approach is applied for assessment of recent trends of sheet, rill and gully erosion in different landscape zones of study area. Investigation is undertaken in 6 selected sectors (area of each transect is about 6-10 thousand km2), uniformly distributed over the area of the Russian Plain. Changes of the different factors, including some meteorological and hydrological parameters, land use change, USLE C-factor, were determined for the period 1980-2015. A set of field methods was used for quantification of sediment redistribution rates for the key small catchments. It was found that erosion rate decreased in forest and forest-steppe zone. Gully density decreases considerably in all landscape zones. The reduction of surface runoff from cultivated slope during snow-melting is the main reason of decreasing of sheet, rill and gully erosion rates in the forest, forest steppe and the north of steppe landscape zones. Increasing the proportion of perennial grasses in crop-rotation is the other factor of serious reduction of erosion processes in the forest zone.

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References

[1] Sidorchuk A Yu and Golosov V N 2003 Hydrological processes 17 3347-3358

[2] Veretennikova M V, Zorina E F, Kovalev S N, Lyubimov B P, Nikol'skaya I I and Prokhorova S D 2006 Geography of gully erosion (Moscow: Izd-vo MSU) 324

[3] Larionov G A 1993 Water and wind erosion: the main principles and quantitative estimates (Moscow: Mosk.Univ. Publ. House) (in Russian)

[4] Litvin L F 2002 Geography of soil erosion on agricultural lands of Russia (Moscow: IKC Akademkniga) 255 (in Russian)

[5] Golosov V N 2006 Erosion and deposition processes in river basins of cultivated plains (Moscow: GEOS) 296 (in Russian)

[6] Kanatieva N P, Krasnov S F and Litvin L F 2010 Eroziya pochv i ruslovye processy 17 14-27 (in Russian)

[7] Rosstat 2015 Russian Federal Service of State Statistics (Moscow, Russia) Available from: http://www.gks.ru - ref-separator -

[8] Lyuri D I, Goryachkin S V, Karavaeva N A, Denisenko E A and Nefedova T G 2010 Dynamic of Agricultural lands in Russia in XX century and postagrogenic restoration of vegetation and soils (Moscow: GEOS) 416 (in Russian)

[9] Ivanov M A 2017 Changes of cropland area in the river basins of the European part of Russia for the period 1985-2015 years, as a factor of soil erosion dynamics. This volume

[10] Golosov V, Gusarov A, Litvin L, Yermolaev O, Chizhikova N, Safina G and Kiryukhina Z 2017 Integrating monitoring and modelling for sediment dynamics Okehampton, UK, 11-15 July 2016, Proc. IAHS 375 ed A Collins, M Stone et al (Copernicus Publications) 27

[11] Litvin L F, Kiryukhina Z P, Krasnov S F and Dobrovolskaya N G 2017 Pochvovedenie 11 1400

[12] Golosov V N 1998 Geomorphologie Relief, Processus, Environnement 1 64

[13] Golosov V N, Walling D E, Konoplev A V, Ivanov M M and Sharifullin AG 2017 Application of bomb- and Chernobyl-derived radiocaesium for reconstructing changes in erosion rates and sediment fluxes from croplands in areas of European Russia with different levels of Chernobyl fallout J. Environment Radioactivity (in press, Available online 18 August 2017)

[14] Medvedeva R A, Golosov V N and Yermolaev O P 2017 Spatial-temporal assessment of gully erosion in zone of intensive agriculture, European part of Russia Geography and Natural Resources (in press)

[15] Butakov G P, Zorina E F, Nikol'skaya I I, Rysin I I, Serebrennikova I A and Yusupova V V 2000 Erozionnye I ruslovye processy 3 (Moscow: MSU) 52-62

[16] Kireeva M B, Frolova N L, Winde F, Dzhamalov R G, Rets E P, Povalishnikova E S and Pahomova O M 2016 Geography, environment, sustainability 9 33-47

[17] Petelko A I, Golosov V N and Belyaev V R 2007 Proceedings of the 10-th international symposium on river sedimentation 1 (Moscow) 311-316